ABSTRACT

A method of forming a more uniform copper interconnect layer is described. A dielectric layer, electroconductive (EC) layer, and a photoresist layer are sequentially deposited on a substrate. An opening in the photoresist is etched through the dielectric layer while the EC layer serves as a hard mask. Following deposition of a diffusion barrier layer and copper seed layer on the EC layer and in the opening, the copper seed layer is removed above the EC layer by a first CMP step. The EC layer serves as a CMP stop to protect the dielectric layer and provides a more uniform surface for subsequent steps. Copper is selectively deposited on the seed layer within the opening. A second CMP step lowers the copper layer to be coplanar with the dielectric layer and removes the EC layer. The resulting copper interconnect layer has a more uniform thickness and surface for improved performance.